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Outcome-Based Skilling Faculty Development Programme

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ABSTRACT

Technology is changing. The nature of work is changing, and there is a need to prepare the faculty to bring disruption in education. Tomorrow's jobs don't exist today. So, educational organisations should focus on life-long learning. There has to be an organised and continuous effort for upskilling and reskilling. The paper on outcome-based skilling faculty development programme discusses the strategic response to the changing skill demands in the FDP organised during COVID-19 by Centurion University of Technology and Management, Odisha. Two hundred and twenty faculty members participated in the FDP. The faculty development programme used diffusion and disruption as tools for change. The paper defines the objectives of the FDP, describes the learning stages beginning from awareness stage to the adoption stage, and concludes with the outcome of the FDP. Ratcheting method, talks by industry experts, international talks from academia, peer learning, fast track learning, competency-based learning, adaptive learning, quick decision-making emerged as best practices for outcome-based learning

1. Introduction

There is a need to re-imagine learning in the new era of education. The current education system was made for Industry 1.0 and certainly not for Industry 4.0. The challenge right now is not merely producing engineers and

managers but graduates who can sustain in the volatile environment of the future. To bridge the education-employability gap and build a skilled workforce, we have to get industry partners to the forefront. The jobs available now will become obsolete tomorrow. As per a report, around 46% of the workforce would be engaged in entirely new jobs by 2022 that do not exist today or will be deployed in jobs that have radically changed skill sets (Future of Jobs in India, 2017)). In age of disruption, educational organisations should focus on upskilling and reskilling of employees in Python, Artificial Intelligence, Machine Learning, Internet of Things, Data Science and other emerging areas to enhance its competitive edge amidst the changing paradigms.

To remain at the forefront, faculty development programs will need to broaden their focus, consider diverse training methods and formats, conduct more rigorous program evaluations, and foster new partnerships and collaborations. Academic vitality is dependent upon faculty members' interest and expertise; faculty development has a critical role to play in promoting academic excellence and innovation [2]. Net Generation students assume a technology-enabled context in much of their lives and work; they exhibit a degree of digital literacy not necessarily shared by faculty; and they too need the full complement of knowledge and skills to be FIT. Current and future faculty are expanding their understanding of the Net Generation, technology, and pedagogy in an effort to improve teaching and learning. For this to occur, Baby Boomer and Gen-X faculty, as well as graduate students, need systematic support to develop and maintain their own fluency in information technology—to be FIT [3].

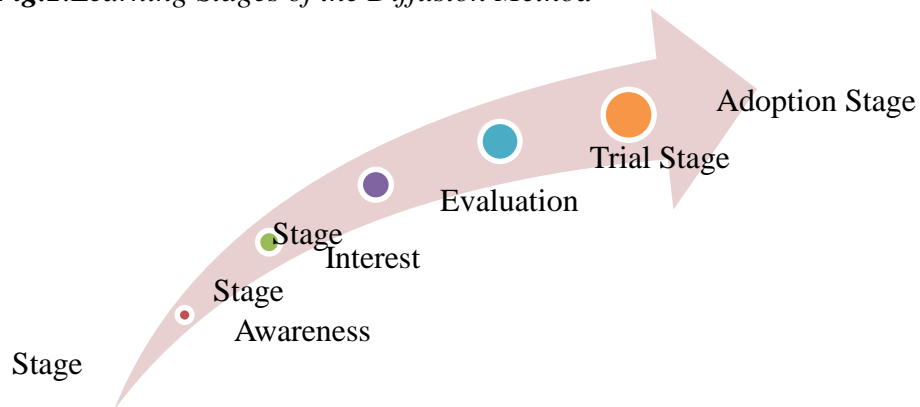
2. Objectives

- To re-imagine learning in the digital era
- To maximise learning efficiency, effectiveness and engagement in teaching and learning to stay relevant to the current times
- To familiarise the faculty of various streams the building blocks of machine learning and how to do programming in Python.

3. learning stages

The faculty development programme organised during COVID -19 defines the diffusion method to help the faculty plan their learning journey:

Fig.1. Learning Stages of the Diffusion Method



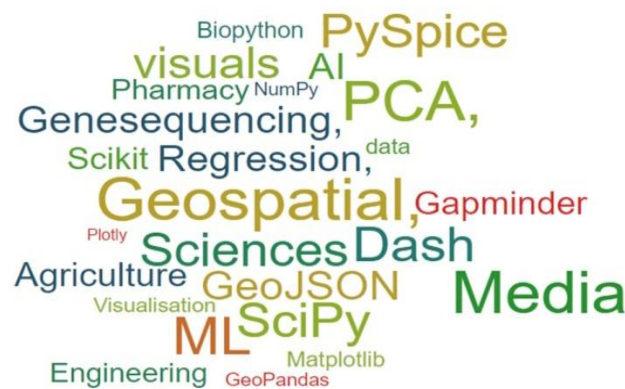
(i) Awareness Stage

The faculty development started with the “Hello world”. The main aim of the Faculty Development Program (FDP) was to learn Python, the new English from the scratch. The FDP began with the use of Google search engine to look for the Python IDLE software and its installation process. It was not the resource person who was working on computer and showing the participants, but it was one of the participants sharing the screen and doing under the instruction of the resource person.

(ii) Interest Stage

In the interest stage, it was observed that faculty was interested in the new idea and sought for more information. The FDP was successful as the faculty members were curious to present the new findings and innovations. The productive discussions moved the FDP to the next level (Figure 2). The FDP continued with other demanding topics such as learning the industrial tools (e.g. Biovia), working on latest technologies, robot operating system trainings. The positive engagement of faculty in learning new things, new tools, and new technology was a release from the psychological disturbances, and stressful situations during the COVID-19 crisis.

Fig.2. Extended FDP Topics



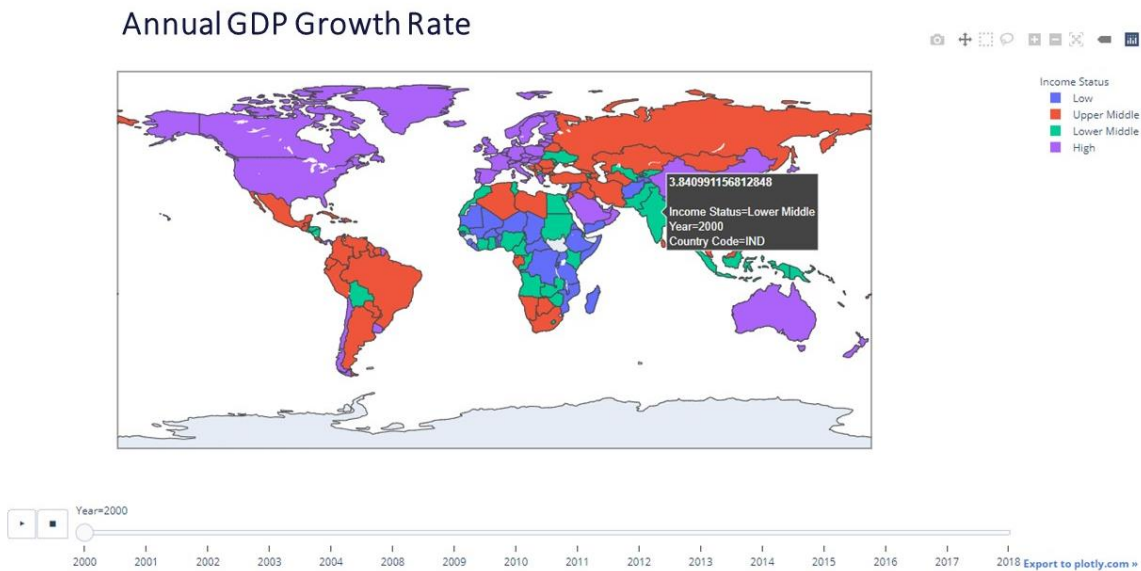
(iii) Evaluation Stage

The participants evaluated the ideas with information, and planned future course of action.

(iv) Trial Stage

Participants used the new idea on a small scale into to determine its utility in his/her own domain. They explored for different libraries in python for plugin of their areas of interest. For example, BioPython for Gene sequencing was explored by Agriculture faculty.

Fig.3. Participants Exhibit their Learnings

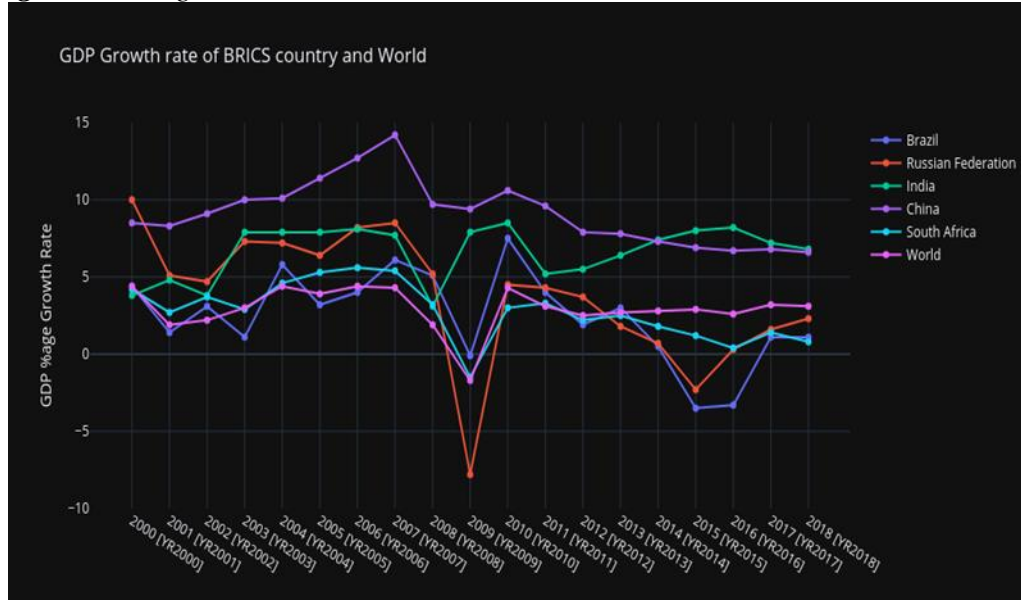


(v) Adoption Stage:

The faculty development program was a meaningful journey from the awareness stage to the adoption stage. The participants used the new ideas continuously on a full scale. The outcomes of the adaption stage are as follows:

- The FDP ended with the formation of task force teams for Visualization, Python for Machine Learning and Deep learning. Tasks were assigned such as Story Telling Using Python Visualization, Paddy Predictor Using Python, Image Processing of Mining Data using Python, Gene sequencing using Python.

Fig.4. Learning Outcome



- Courses for students were revamped including core course for all undergraduate students (Data Analysis and Visualization using Python, Domain courses such as Data Analytics- Visualization, Data Analytics – Machine Learning, Business Analytics. The presentations and assignments solved by the faculty in the FDP were integrated in the courses. Practice and project materials, used cases were included in the courses. Courses, where C programming was used, substituted with Python programming.
- Faculty gained confidence to learn new topics from internet by Googling.
- Some faculty members exhibited transformational leadership qualities. They emerged as the ‘Star performers’ of the University. Quick learners were identified and appreciated.
- Faculty across campuses could participate and learn including the senior management team of the university.

4. Conclusion

The faculty development programme was successful in bringing about a transformational change at the university. The paper recommends the inclusion of the best pedagogical practices for outcome-based teaching and learning:

- **Ratcheting Method:** The faculty development programme used the ratcheting method where you don't follow the regular pattern of going on topics progressively, but it was actually jumping from topic to topic (may be unrelated or not necessarily of the next difficulty level). Doing the ratcheting way had its own advantages - beginners learn as well as experts learn from the same FDP. It provides learning to all as topics were wide and

vast. In fact, areas from visualization of World Development Indicators, to doing PCA analysis to Satellite image processing to Gene sequencing to Predictor models: all were covered.

- **Industry Experts Speak:** Industry experts (e.g. Amazon, Dassault) were invited to deliver talks via Zoom about disruption in technology. The experts extended support to fill the industry and academia gap through partnerships and collaboration.
- **International Speakers from Academia:** Researchers in Gene Sequencing, Nutraceuticals etc. doing their research work with programming delivered and exhibited their work and learnings. Faculty members of the university could also share their research work with the experts and obtained feedback.
- **Collaborative Learning:** Individual as well as group presentations were made by faculty members. As a result, the interdisciplinary collaboration could be easily seen. Ironically, it was not being done earlier when people used to meet together and work together, but during the lockdown and social distancing, employees learnt and performed collaborative work.
- **Peer Learning:** This was a wonderful opportunity for faculty to learn about the research work done by their colleagues from other disciplines. Definitely this would go a long way to appreciate and learn from each other.
- **Fast Track Learning:** It was like every day coming across different areas of application being presented by faculty groups. So, faculty worked beyond the FDP hours to get themselves prepared for presentation to colleagues and go for a productive discussion with mentors and outside experts.
- **Adaptive Learning:** Adaptive learning assists one in learning as efficiently and effectively as possible. Technology today can scale the benefits of 1-on-1 mentorship, providing each learner with a personalised course, which adjusts in real-time for his/her performance and engagement level.
- **Competency-based Learning:** Competency-based learning is encouraged to acquire concrete skills over abstract learning. Rather than a module, every individual skill or learning outcome is one single unit. Learners work on one learning goal. One is evaluated on the basis of one competency at a time. This is a small component of a larger skilling process, but the individual can move to the next level only after mastering each skill.
- **Googling:** The abundance of information available at internet was used to learn and share in the FDP. Starting from knowing whether any module in Python is there in their area of research, to installing the module, to have step-to-step guide, to learning through solved examples and areas of application. All are in store. One has to only go to the self-learning mode to

acquire the new technologies and start working on it. A big learning community is there to support through their knowledge sharing via internet.

- **Quick Decision-making:** Quick decision making will be the new mantra. This generation has a very short attention span and believe in instant gratification and if the system does not keep pace with providing crisp, curated, relevant information with easy accessibility it would be worthless.

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